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UNITED STATES DEPARTMENT OF AGRICULTURE
Bureau of Entomology and Plant Quarantine

SUMMARY OF SCREW-WORM STERILIZATION RESEARCH

A. W. Lindquist

Laboratory studies have demonstrated that when pupae of the screw-worm are exposed to 2,500 to 5,000 roentgens of X-rays or gamma rays from Cobalt 60 the emerging flies are sterile. These flies are not appreciably injured except that they are not capable of reproducing. The sterile males mate with normal females and these females deposit eggs which are infertile. The females of the screw-worm mate only once even when mated with sterilized males. The sterile males compete successfully with normal males in cages. It has been shown in cages containing 10 normal females, 10 normal males and 90 sterile males that about 87 percent of the females lay infertile eggs.

It is, therefore, theoretically possible to release in an area sterile males at a rate of 5 to 10 times the number in nature every week and in several months' time eliminate the species. These insects can be reared on artificial media in large numbers in the laboratory. The southeastern states harbor screw-worms now only because they were accidentally introduced in 1933.

During average winters screw-worms are destroyed by the weather in all but the southern two-thirds of Florida. The ultimate objective is to release sufficient numbers of sterile flies in Florida during the fall, winter, and spring so that the insect will be eliminated. Such a program would cost no less than a million dollars. We are not prepared to recommend initiation of such a costly program without reasonable assurances that the objective will be achieved.

Field tests have been under way in Florida for two years in efforts to determine the feasibility of the method. Sterile male flies were released on Sanibel Island and adjoining Captiva Island two to three miles off the coast of Fort Myers, Florida last winter where a natural screw-worm population was present. The sterile males were released at a rate of 100 per square mile per week for a period of about 12 weeks. During the first month of releases about 80 percent of the egg masses deposited on wounded goats by wild flies were sterile. Subsequently only a few masses were collected which we believe came from flies migrating on the island. We feel that elimination of the insect would have resulted on this 16 square miles if it had been completely isolated.

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BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

REPORT OF JOHN W. HINDSHAW

A. W. Hindshaw

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On Captiva Island, where a higher natural population existed, only about 35 percent of the wild females deposited infertile eggs. On the basis of available information we believe that the natural population on this island was much higher per unit area than the average for the state as a whole.

There are two major difficulties with the Sanibel experiments. The island is not completely isolated and so small that some of the released flies may have left the island before mating and some flies from the mainland may have flown on the island. Consequently there is need for another island location to perform conclusive field tests.

The only promising island found is Curacao, about 190 square miles in area, in the Caribbean off the coast of Venezuela. Preliminary surveys here indicate that the average screw-worm population on this island is higher than the average in Florida, but perhaps lower than that which occurred on Captiva Island. To test the effectiveness of the releases of sterile screw-worm flies we plan to release about 200 sterile males per square mile per week. If this proves successful on this island we believe that an average release rate of 100 male flies per square mile per week for a year or two would prove feasible and effective in Florida.

For the Curacao experiment we plan to rear and sterilize the screw-worms at the Orlando laboratory where headquarters are already set up and a large Cobalt 60 source for sterilization is located. The pupae can be shipped by air to Curacao in a few hours' time and subsequently released.

